Soil
Conservation
Devoted to the wise use of land and water resources

35/3 October 1969

Windbreaks—

On the plains
In the desert
On muckland farms
Where forests grew before

Also—

Boy Scouts and conservation

Soil Conservation Service
U.S. Department of Agriculture

Long view . . .

Our lead articles this month reinforce the thesis that conservation plans and rewards span the generations.

For a historical view of windbreaks in the Plains, the Forest Service provided photographs of tree plantings made in the "Dust Bowl" days. Information Specialist John Cross then helped Forester Art Ferber and state fieldmen check on the condition of those plantings today.

Their summary (p. 51) of what we have learned from the experience emphasizes the benefits today's farmers enjoy from the efforts of their fathers and grandfathers.

Against the wind

The long-term view is evident also, as with all tree plantings, in the accounts of windbreaks protecting the railroad across the Coachella Valley in California (p. 55); a farmer's growing tree barriers against the winds in the mucklands of Wisconsin (p. 62); and the reestablishment of shelter around farmsteads in Ohio (p. 57).

Looking ahead

The next generation's stake in conservation is implicit in the Boy Scouts' "statement of commitment" (p. 59) distilling the thought of some 30,000 boys attending their 7th National Jamboree in Idaho.

Education Specialist Walter Jeske and 19 other SCS staffers lived and worked with the youths and leaders "for the duration." Walt brought back the center-spread account of the affair.

COVER: A wintry view between redcedar rows in a Nebraska windbreak looks out on a field that will be watered by the trapped snow.

October 1969 Vol. 35, No. 3

Soil Conservation

Devoted to the wise use of land and water resources

51 **Windbreak plantings continue**
By A. E. Ferber

55 **Windbreaks of tamarisk lead railroad through desert**
By Frank L. Brooks, Jr., and Robert Dellberg

56 **Plot studies relate growth of windbreaks to soils**

57 **Windbreaks protect and beautify landscape**
By A. N. Quam

59 **Conservation—today's frontier**
Scout Jamboree

62 **Artist-farmer pioneers use of windbreaks**
By George W. Alley

63 **Developer bases plans on soil survey**

64 **Windbreak planting is big operation**
By W. H. Youtz

65 **The computer in river basin planning**
By S. Glade Wilkes

67 **Conservation in action**
Forest program, Mississippi; Grass planter, Alabama; Grazing management, Oklahoma; Range capacity, Nebraska; Mailman honored, Michigan; Parallel Terraces, Texas

69 **Meetings**

69 **Review**

71 **From the Administrator**
Windbreaks and conservation

72 **Operation Arbor Green**

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture
KENNETH E. GRANT, Administrator, Soil Conservation Service
BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

SOIL CONSERVATION is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Bureau of the Budget July 17, 1968.
Reprint permission: Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.
Commercial names: Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.
Subscription: $2.50 per year, $3.25 foreign. Single copy 20 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

A generation of grateful landowners . . .

Windbreak plantings continue as farmers profit from shelterbelt experience

By A. E. Ferber
Regional forester, SCS, Lincoln, Nebr.

Many of today's landowners, especially in the Plains and Prairie states, are reaping the benefits of the foresight and labors of an earlier generation of tree planters.

In the United States there are more than 630,000 acres of farmstead windbreaks and 86,000 miles of field windbreaks. At least two-thirds of them are more than 10 years old, so they have significant effectiveness as shelter for people and livestock and protection of fields from soil erosion.

"The greatest . . ."

Wayne Walmer of Orchard, Nebr., is one of the grateful landowners. He farms land where his father-in-law, Charles Johnston, planted windbreaks in 1938 as part of the Plains Shelterbelt Project.

"Shelterbelts are the greatest thing that ever came to this country," Walmer says. "For my money, no cattle shed can compare to a windbreak for shelter."

Farmers like Walmer and Johnston are continuing to plant trees apace today. Last year, soil conservation district cooperators across the Nation planted approximately 20,000 acres around farmsteads and 3,500 miles of rows or belts in fields.

A long history

Although today's use of tree windbreaks evolved in a direct line of experience from the famous shelterbelt project of the 1930's, windbreak plantings began years before that.

In Nebraska and other Great Plains states they date back to 1854 when settlers dug wild native seedlings and set them around their homes.

Kansas in 1865 enacted a "tree bounty" law under which a landowner could plant an acre or more of trees or a half mile of windbreak and get paid $2 an acre per year for 25 years.

The Timber Culture Act of 1873 offered free land to Plains settlers who would agree to plant a fourth of every quarter section to trees.

Only a small percentage of those early-day tree claims were successful. Hardiness, or lack of it, of the kinds of trees planted was one of the problems. Little or no thought was given to soil adaptations.

Needs for more scientific information led the South Dakota State College to set up research as early as 1895. Other colleges in the Plains followed, and some of these studies are still going on. Early in this century (1915-25), the U. S.

"Only about 20 percent of farms and ranches that need windbreaks have adequate ones"

Bureau of Plant Industry started research plots to determine best species, spacings, and cultural methods.

Railroads played their part in tree plantings. The Great Northern Railroad planted snow traps on their rights-of-way next to cuts to minimize drifting of snow. As the railroads opened the West, tree salesmen hawked their wares to settlers within wagon or buggy distance of the depots.

The Clark-McNary Act of 1924 made tree seedlings available at cost for planting windbreaks.

Great Plains Shelterbelt

Perhaps the most publicized planting program was the Great Plains Shelterbelt of the 1930's. Because of the "Dust Bowl" conditions growing out of the drought of that time, the Forest Service was authorized in 1934 to make studies of tree-planting needs and possibilities in the Plains states.

They thought big, and the press and public enlarged upon their plans. Many people envisioned a 100-mile wide, 1,100-mile long belt of trees reaching from Canada to the Texas Plains.

Actually, foresters recommended planting field windbreaks a quarter of a mile apart within the 100-mile wide belt. These were to be 10- to 12-row patterns 132 feet wide plus a 32-foot right-of-way for maintenance. If completed, they would cover 2 million acres.

Approved by the President in 1935, the project employed Works Projects Administration and Civilian Conservation Corps labor to plant 200 million seedlings during the period of 1935-42. Added together, the plantings totaled 18,500 miles in length and occupied 238,000 acres in six states.

Harold Schwager near Orchard, Nebr., is what might be called a third generation landowner benefiting from windbreak plantings. He owns one of the first shelterbelts planted in Nebraska with technical assistance of the Soil Conservation Service. He bought the property last spring from the Ralph Howard estate, and Ralph was the son of John C. Howard who planted the windbreaks on April 23, 1935.

The Shelterbelt Project was transferred to the Soil Conservation Service in 1942. Slowed considerably by the war years, plantings began expanding slowly during the late 1940's, primarily farmstead windbreaks. Landowners included some protective planting of trees in their total conservation plans for all the land, and soil and water conservation districts began tooling up to help do the job.

Today's districts in the Lake and Plains states now own more than 450 mechanical tree planters for use by cooperators in planting windbreaks. They arrange with state and federal nurseries to provide seedlings, and some districts own their own nurseries. Districts also have 250 mechanical weeders and 200 or more sprayers for use in weed control when windbreak plantings are young.

"What happened to the shelterbelt?" was a question often asked in the 1950's. Studies made in 1954 showed 73 percent of the plantings still in fair to good condition. Se-

Then and now . . .

Many of the windbreaks planted in the Shelterbelt Project of the 1930's are giving effective protection to adjacent croplands today. These two examples show comparisons to U. S. Forest Service photographs taken soon after planting. At left, windbreak planted in 1939 on H. B. Steinmetz farm, Kansas; at right, planted in 1939 on Charles Johnson (now Wayne Walmer) farm, Nebraska.

vere droughts in the 1950's destroyed a lot of trees in the Southern Plains. General neglect and grazing by livestock had eliminated some in the Northern and Central Plains states. Summary observations reported about half of the original plantings still effective. But they taught some valuable lessons.

The Shelterbelt Project has verified the experience of several Government agencies and many landowners that trees can be successfully grown in the Plains if certain precautions are observed. These involve the careful selection of adapted species to fit the soil and site conditions, adequate site preparation, good quality nursery seedlings, a conscientious planting job, and good cultivation and care as long as the trees live. These principles hold true for other parts of the country.

The first three windbreaks planted (on the same day) by farmers, who later became conservation district cooperators in Nebraska, are now 31 years old. This one is on the Harold Schwager farm in the Antelope District.

Observations made during the late 1940's and early 1950's showed that 10-row field windbreaks protected little more cropland than those of three to five rows. Narrow windbreaks result in savings in two ways. They don't cost as much to plant and maintain, and they take less land out of crops.

The planting of field windbreaks had dropped to practically zero in the late 1940's and 1950's, but it spurted up to 4,000 to 5,000 miles annually in the 1960's.

Single-row tree windbreaks have been used for many years on the muck and sandy soils of Indiana, Michigan, Wisconsin, and along the eastern seaboard. They are also planted for orchard and truck crop protection in the Pacific and Southwest states. They are presently quite popular in Minnesota, the Dakotas, and Nebraska.

People with good windbreaks value them highly. More than 200 Kansas and Nebraska farmers and ranchers, a number of years ago, were asked to put a dollar value on farmstead windbreaks. Livestock feeders said their savings averaged about $800 a year; dairymen figured more than $600; and those with fruit and vegetable crops said they saved $80 to $100 each year.

South Dakota farmers say windbreaks increase the value of their land by $8 an acre. Bankers and real estate dealers in other states

add $1,000 to the appraised value if there is a good farmstead windbreak.

But do they reduce the wind erosion? Studies by the Department of Agriculture and Purdue University show a 35 to 75 percent reduction in wind velocity by a windbreak, depending on density. Effective protection extends from eight to 15 tree heights away. Thick, wide barriers provide a higher reduction percentage close in, but less dense ones give protection farther out. The lower the velocity of the wind, the less soil it will move. Among the highest values of field windbreaks are their role in reducing peak wind velocities in windstorms.

Windbreaks attract and shelter wildlife. State game department officials say deer are more common now in areas where there are many older windbreaks. Quail, dove, and pheasant hunters follow the windbreaks because this is where they are most likely to find game. Songbirds value windbreaks for nesting habitat and temporary homes.

Windbreaks break up the monotony of treeless landscapes and lend a feeling of security to their owners. It is easier to grow shrubs, lawns, flowers, and vegetables where protected by adequate tree barriers.

Modern windbreak patterns fit the land, climate, and need of each location. In the Northern Plains, field windbreaks commonly consist of green ash, Siberian elm, and caragana. Southward, they change to ponderosa pine or redcedar and hackberry. At the southern end of the Plains, southern pine or aborvitae are a possible choice. Most of the plantings in the Lake states, Indiana, Illinois, and eastward contain the native pines, adapted spruces, and, in some localities, willows and privet. Eucalyptus is common in windbreaks in California; local pine, firs, and spruce are favored in the Northwest; and the southern pine is good in the South.

Farmstead and feedlot protection plantings use these same species, but they may have fruit and ornamental plants added. This type of planting has seven or eight rows in the Northern Plains and four or five rows in the South. Species of special value to wildlife are often added.

In the Nebraska Sandhills, ranchers plant "outdoor barns" to protect livestock on the open range from blizzards. These usually consist of 15 to 30 rows of native pine and eastern redcedar. Several hundred are established each year.

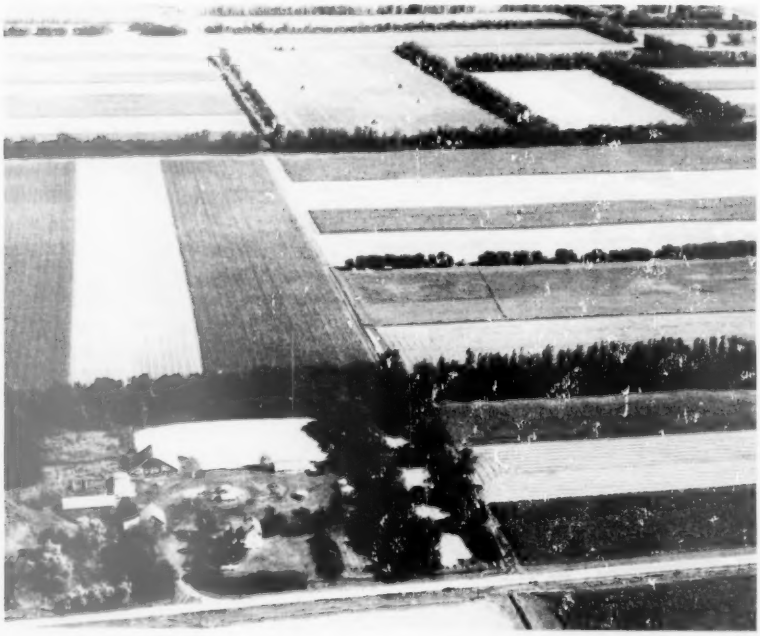
In many older plantings, volunteer seedlings are commonplace. These will replace the older trees as they die.

There are, of course, some problems in establishing windbreaks. There is an urgent need for faster growing, bushier, longer-lived species or improved types of the common species used today. Careless use of chemicals for killing weeds in grain crops sometimes results in damage to windbreaks. And people are sometimes too impatient for results to plant the better, slow-growing species. The fast-growing kinds are short-lived and in a few years the planting is no longer effective.

Despite all the efforts of homeowners and public and private agencies, only about 20 percent of farms and ranches that need windbreaks have adequate ones. Instead of planting by hand, we now can use machines. Instead of hoeing and pulling weeds by hand, we can do the job with machines or safe chemicals. In many counties the Agricultural Conservation Program cost-shares the planting of needed windbreaks, and good quality seedlings are available from private and state nurseries at reasonable cost.

More and more people with jobs in towns and cities want to have a home and a small acreage in the country within driving distance. They welcome windbreaks as a part of their surroundings since the small investment they make in tree planting pays such handsome dividends in helping to make a home instead of just a place to live. ♦

Farmstead and field windbreaks combined with wind stripcropping give protection to the Vernon Swanson farm in the Brown-Marshall Soil Conservation District in South Dakota. Windbreaks continue into the distance on neighboring farms.



Southern Pacific Railroad planted tamarisk as a windbreak (above) to prevent blowsand from damaging rolling stock and rails. Much sand originates from around buildings in the desert (below).

Windbreaks of tamarisk lead railroad safely through the desert

By Frank L. Brooks, Jr., and Robert Dellberg
Regional agronomist and state woodland conservationist, SCS Portland, Oreg., and Berkeley, Calif.

A 20-mile long windbreak of tamarisk trees, some of them grown 35 feet high in 9 years, helps keep Southern Pacific trains rolling across the Southern Desert in California.

The windbreak, combined with dikes to trap the blowing sand, is the solution worked out by SCS conservationists and railroad officials to a problem that has plagued the company since 1879.

A savage land

In 1960, railroad officials sought guidance through the Coachella Valley Soil Conservation District in its efforts to control windblown sand on its roadbed and sandblasting of its rolling stock.

The Upper Coachella Valley where the railroad crosses the desert is a land of great and strange contrasts. Temperatures range from 13° to 125° on the valley floor. Rainfall is nil for most months of the year with an annual average of only 4 inches. Blowing with savage velocity, winds pick up sharp sand and literally sandblast everything in their path. Climatic wind-erosion factors for this area are five to 10 times as severe as those of the Great Plains.

In recent years, the wind-erosion problem has become even more severe because the sandy soil has been exposed by road and highway construction and by development of nearby residential subdivisions.

The effect of a sandstorm is almost unbelievable to those who have never experienced one. The sand is a sharp, abrasive quartz material. Moved by winds up to 30 or 40 miles an hour, the particles cut off wooden utility poles and fence posts, abrade metal, and severely scour glass.

The sand collects around cross ties in the roadbed. Trains passing over the track create movements that cause the wooden ties to wear and loosen iron spikes and plates securing the rails. Abrasive sand between the surfaces of wheels and rails causes rapid wear to the track.

Track replaced

Ten miles of track have had to be replaced at a cost of several million dollars. Accumulation of sand in switches and other effects on

safety required trains to be operated at slower speeds than normal.

When the railroad became a cooperator with the Coachella Valley District in 1960, dikes were constructed to provide traps and storage areas for blowing sand. A single row of tamarisk cuttings was planted on each side of 10 miles of railroad right-of-way. More than 70,000 cuttings were used at a spacing of 18 inches apart to insure dense growth. Tamarisk is well adapted to hot dry desert areas. Introduced to California from western Asia, it is tolerant of salty soils, poor quality water, limited or intermittent supplies of moisture, and temperatures as high as 125°F. Its deep extensive root system and rapid growth rate make it a good windbreak tree and its evergreen growth characteristics make it effective throughout the year.

A water jet probe, devised to "dig" holes in the dry, rocky, sandy soil, provided an initial irrigation as planting proceeded. Boards placed on the windward side protected the tender growth, and picket fences prevented drifting sand from burying the plants.

Irrigation and fertilizer

The windbreak was irrigated at 5-day intervals with water containing fertilizer. Pumps delivered the water from a well through pipelines along both sides of the 10 miles of track.

The initial planting produced a continuous row of trees on each side of the 10 miles of railroad. Additional plantings have been made along both sides of another 10 miles, and the company plans to add still more.

When the trees achieved the desired height, irrigation was reduced in frequency and amount. Maintenance requirements have been small.

As a result of the success of these plantings, the Coachella Valley District has received hundreds of applications from area landowners for assistance in sand control. ♦

Plot studies relate growth of windbreak trees to soils

Study plots scattered the length and breadth of the grassland region of central United States are giving the Soil Conservation Service sound guides as to which trees and shrubs will succeed on which soils in the area where trees naturally are the exception rather than the rule.

These studies, started about 10 years ago, are located mostly in the Plains and Prairie states where much windbreak planting has been underway.

SCS now has about 1,100 sets of plots in 12 states providing growth data on nearly 40 species. Since an average of six species are sampled in each study plot, they add up to around 6,000 sets of measurements. Work on this project continues on a limited basis, and future studies will be conducted where most needed.

For these studies, teams consisting of a forester and a soil scientist select windbreaks growing on the more important soils or soils that present special problems. The plantings selected are at least 15 years old, and have had reasonable care during their life span. The study plot within each selected windbreak must be on a single kind of soil.

The forester makes sure that the sample area is representative of the growth and performance for each species on the soil unit. He measures and records the diameter, height, crown spread, and many other data about each species of tree and shrub. The soil scientist sees that each sampled area is representative of a soil taxonomic unit and that each unit is within the central concept of the described and named soil studied. He also studies and records the plot's soil profiles to a depth of at least 5 feet, or to 8 feet on sandy soils, along with many other soil data.

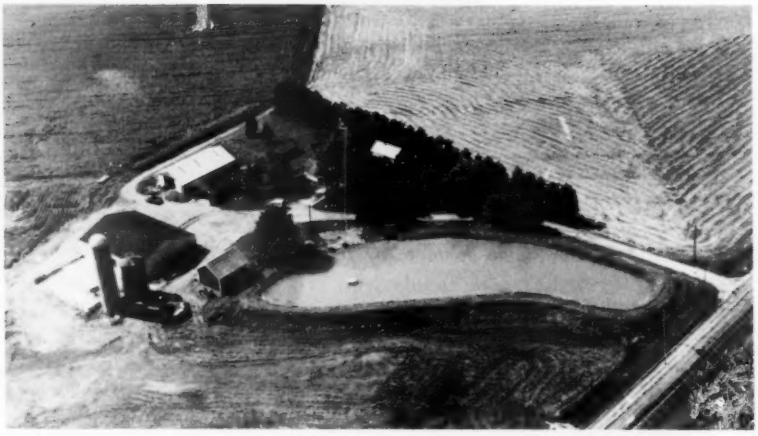
The study plots consist of a cross-section segment of the windbreak, usually 25 plant spaces in length. They are identified so they can be located easily for remeasurement and later evaluation if needed.

The results from these studies provide information for projecting the expected future performance of adapted trees and shrubs when planted on known soils; guides for selecting species to plant in windbreaks when the soil and climate are known; and other information for use in technical guides and soil survey reports. Also, data are assembled and analyzed for selected benchmark soils to serve as guides for windbreak interpretations for other similar soils.—ARTHUR E. FERBER, *regional forester, SCS, Lincoln, Nebr.* ♦

SCS Scientist Kenneth Good and Forester Jim Carr study how fast and well trees grow in a soil study plot.

Windbreaks protect and beautify Ohio landscape

By A. N. Quam
Woodland conservationist, SCS, Columbus, Ohio



A 3-year-old Norway spruce windbreak combines with a pond to create hospitality on a farmstead in Williams County.

Even though the song, "Beautiful Ohio," was written about the river that flows along the southeastern border of the state, the surrounding topography must have added some of the inspiration. Undoubtedly, southeast Ohio is the most scenic half of this industry-oriented state. The terrain rolls out to a panorama of crops, pastures, and extensive woodlands. Here strong winds are buffered by trees and ridges.

It's another story to the west and north where the topography "gentles out" from undulating to flat; trees are fewer and farther apart; corn and soybeans have captured the land—and the wind hits one square in the face!

Northwest Ohio was not always open to eroding winds.

Ohioans point out that here once was a broad land of trees. It would become so again, if left undisturbed, as plainly attested by the idle lands bordering the cities.

Trees are cleared

History records that 95 percent of the state was originally a forest of the finest wood species. Oaks, hickories, chestnut, tuliptree, walnut, cherry, elms, ashes, cucumber, maples, beech, and even some white, shortleaf, and Virginia pines—all these and more were represented. They still are—only the abundance and quality are missing.

Ohio's early settlement commenced about 1800 and gained momentum after 1825. Settlers had to battle the forest to survive. Each family laboriously cleared land to grow food crops, and by midcentury the deforestation was in full swing. Manifestations of this battle survive to this day in northwest Ohio as long-conserved woodlots grudgingly give way to bulldozer and axe.

Windbreaks return

After the 1850's there were sporadic efforts to reestablish trees around farmsteads—obviously for protection. A 110-year-old multirow planting of eastern redcedar protects a farmstead in Hardin County, midway between Toledo and Columbus. A number of 70- to 90-year-old Norway spruce wind barriers stand today in northern and western Ohio. There are also several Scotch pine and catalpa plantings of the same age in that area.

Farmstead windbreak plantings continued into the present century on a limited scale. Windbreaks and "block plantings" for forestry purposes increased in the mid-1930's on the rekindled conservation wave of that depression era.

Assistance for planting

Recent years have seen an acute awareness of the need for tree planting on the northwest Ohio landscape. Technical specifications have been developed by SCS in cooperation with the Ohio Division of Forestry

Four rows of red pine, white pine, Norway spruce, and mixed shrubs planted in 1932 protect a farmstead in Fulton County.

A farmyard in western Ohio sheltered by 10 years of tree growth.

and Reclamation and the Ohio State University Cooperative Extension Service. Cost-sharing assistance to landowners has been made available through the Agricultural Conservation Program.

Minimum cost-share specifications for farmstead windbreaks in Ohio call for two rows of conifer trees plus one row of shrubs. A minimum distance of 75 feet between the nearest row and the closest major protected object or area is also specified. This latter is to provide space for snow catch and eddy effect. Use of larger size, older, balled and burlap planting stock, though not required, is nevertheless supported by larger cost-share payments to encourage wider landowner participation. Field windbreaks, to date, are popular mainly in the muck crop areas.

Wildlife packets

Considerable impetus is also given to wind protection and landscape beautification by use of the so-called wildlife packet program. In this effort several contiguous soil and water conservation districts cooperate to provide "packets" of 50 to several hundred ornamental and wildlife tree and shrub seedlings. This program is very popular in Ohio, especially with agricultural residents who have only limited space for planting trees. There are enough conifer and shrub seedlings in every packet to start a windbreak that is attractive to small game, songbirds, and people. Seedlings are purchased in bulk from nurseries and rearranged into packets for delivery to district cooperators.

Interest in windbreaks and other landscape enhancement plantings has enjoyed a definite revival in Ohio's "corn - soybean - vegetable belt" during the past decade. Northwestern Ohio in its own particular style rivals the southeast in terms of attractiveness and definitely deserves recognition for its contribution to a "Beautiful Ohio." ♦

Balled and burlap stock offers protection after only 2 years. A row of mixed shrubs (left) supplements two rows of Scotch pine on the windward side.

Good grassland program restores farm

A good grassland program helped transform a former dairy farm to a cattle-producing enterprise in St. Martin County, La.

District Cooperator Frank Simon had to close his 61-acre dairy farm because of poor pastures. He retained a few head of low-grade cows to start a commercial beef herd.

A soil survey showed that the entire farm was well adapted to most grasses and legumes. Under an ACP practice designed for low-income farmers and with the help of the Soil Conservation Service, Farm Manager Stephen Simon adopted a program of bahiagrass and fescuegrass seeded with S–1 clover.

The St. Martin Soil and Water Conservation District equipped to do pasture work on its cooperators' farms deep plowed, chopped, and fertilized all the fields. Two tons of lime an acre was applied and all pastures seeded as planned.

Grasses and clovers have come up to a good stand, and the farm is a going enterprise again. ♦

Conservation—today's frontier!

Scout Jamboree challenges 30,000 boys to work toward intelligent use and care of natural resources

Statement of commitment

We have a concern for the loss of our natural resources as evidenced by the pollution of our streams, lakes, and the air we breathe, the diminishing wildlife, plants and trees, and the erosion of our soil.

We commit ourselves to the intelligent use of our natural resources through our personal actions and in cooperation with our fellow Scouts and to informing the public about the seriousness of the problems.

The following kinds of projects are recommended:

Seek out the resources of the conservation agencies in our communities to determine restorative projects which we can handle, and carry them out.

Invite representatives of the natural resources agencies to meetings in which to inform Scouts as well as the general public about the common practices which are dangerous to the preservation of natural resources in our communities.

Make a greater emphasis on the Outdoor Code among Scouts by setting up demonstrations and displays in our Scout units and for the public which describe what is expected of each Scout.

During that historic week in July when men first walked on the Moon, more than 30,000 Boy Scouts and Explorers at their 7th National Jamboree were discovering the exciting frontiers of resource conservation on Earth. They learned intelligent use and proper care of the natural resources upon which the whole human family depends is a frontier even more complex and challenging than space exploration.

Farragut State Park, a 5,000-acre reserve on the shores of beautiful Lake Pend Orielle in northern Idaho, was the site for the once-every-4-year national Scout event, July 16–22. As a result of their week-long learning experiences at Farragut, concern for the proper care and management of our Nation's natural resources was the second among seven major national commitments to action formulated by the Scouts and Explorers as they interpreted their overall Jamboree theme: "Building to Serve." Each boy had a role in determining the issues considered for the statement as a part of an exercise in the democratic process. From discussions in every camp, the 19 young leaders of the All Jamboree Forum developed the statement of commitment that each Scout pledged to carry home as a call to conservation action for young people.

The conservation instruction and exhibit area, most popular of all 1969 Jamboree program areas, was developed and manned by some 40 private, state, and federal resource agencies and organizations working with Ted Pettit, director of conservation for the Boy Scouts of America.

Throughout the Jamboree at 30 identical basic conservation instruction stations, Scouts in groups of 40 were given an hour-long lesson in the relationships among resources and principles of conservation. Specially trained professional conservationists from agencies, including the Soil Conservation Service, Agricultural Research Service, Forest Service, and Department of the Interior bureaus, used enlargements of 24 visual aids prepared by SCS Illustrator Felix Summers in presenting lessons around the theme "Conservation—Your Choice."

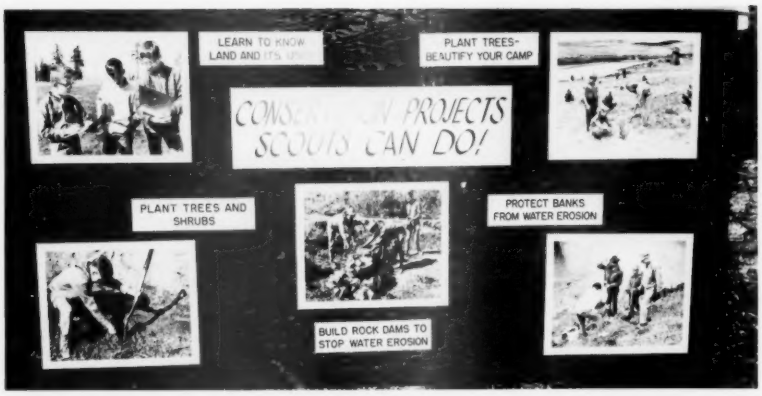
To learn how conservation directly affected them, more than 30,000 Scouts and visitors voluntarily went to a separate conservation demonstration and exhibit area where 19 state and federal agencies had special conservation learning stations. Here SCS developed the

"Conservation — Today's Frontier" trail, featuring two model watersheds prepared in cooperation with the Idaho State Soil Conservation Commission and the Idaho Association of Soil Conservation Districts. The first model depicted natural resources as they appeared on a typical western watershed before the arrival of hunters, loggers, and settlers. The second model of the same watershed as it appears today showed how man could and has developed the watershed resources according to conservation principles in order to meet the needs of people. Scouts were challenged to think in terms of land and water use in the future as the demands of thousands more people in far away cities and on the watershed itself must be met. Then, they realized that conservation management was indeed today's frontier.

After studying a series of seven soil monoliths illustrating the need for accurate information about soils in order to use them intelligently, Scouts had an opportunity to make their own artificial soil profiles from supplies of basalt, decomposed granite, clay, and surface soil. More than 5 tons of northern Idaho soil was carried home by the nearly 20,000 Scouts who constructed soil profiles in 1-inch diameter plastic tubes.

Farther along the SCS conservation frontier trail, boys saw a vivid demonstration of the value of plant cover and mulch in preventing soil erosion by water. They learned of the damage to water quality when bare soil erodes and moving water carries sediment into streams and lakes.

The importance of the predator's role in the natural world and some concepts of wildlife ecology were discussed at the SCS station where the art of falconry was demonstrated. In viewing a 35-foot color mural of conservation practices that benefit wildlife, Scouts learned of wildlife's basic needs and how good land management provides for these needs.


LEARN TO KNOW LAND AND ITS USE
PLANT TREES- BEAUTIFY YOUR CAMP
PROJECTS SCOUTS CAN DO!
PLANT TREES AND SHRUBS
PROTECT BANKS FROM WATER EROSION
BUILD ROCK DAMS TO STOP WATER EROSION

Ideas for conservation projects suggested by photos (top); Scout Edwin De Priest (center) was surprised to see his home farm near Palmer, Alaska, in the SCS "America the Beautiful" series. Model of a typical western watershed (right) as it appeared about 200 years ago shows the natural resources then. Model of same watershed (next right) as it appears today under conservation management, meeting the needs of thousands of people.

More than 20,000 Boy Scouts assembled their own miniature soil profiles (above). Scouts and their leaders (left) intently study the young male goshawk held by Explorer Pat Benson. SCS Hydraulic Engineer Evan Merrill demonstrates action of falling raindrops on bare soil, mulch, and grass-covered plots to show the importance of cover.

An interesting lesson in water-resource management and conservation was depicted by a full-color mural of the snow survey and water-supply forecasting activities of SCS and the exhibit of over-the-snow vehicles and other tools used in this work. At a series of six large panels developed in cooperation with the University of Idaho, Scouts could study six different plant communities of northern Idaho as they were related to particular kinds of soil.

Giving full-time assistance to the SCS instructional staff at the Jamboree were Doyle L. Scott, administrative officer of the Idaho State Soil Conservation Commission, and three Explorers, Pat Benson, Tyler Nelson, and Paul Ralstin, all of Boise, Idaho.

As they carried home from the 7th National Jamboree their personal commitments to action in behalf of conservation, Scouts could well recall the closing words of their conservation lessons: "We have a choice in the changes made by man in our environment, if we but use the intelligence that sets man apart from other creatures with which he shares this world and thereby places upon him a great and inescapable responsibility for taking good care of the earth." ♦

Artist-farmer pioneers use of windbreaks on muckland

By George W. Alley
Forester, SCS, Madison, Wis.

Red sunsets disturb Dean Kincaid, Wisconsin muck farmer. The beauty appeals to his training—he studied to be an artist before he started farming—but he knows all too well that such sunsets can result from dust in the air. And that spells trouble to a muck farmer.

"A farmer can't afford to have his soil blow," says Kincaid, "so he goes to great pains to prevent it. When I began farming in Wisconsin, I rented a sandy field and planted onions. Though the onions were planted 3 inches deep, a single big windstorm left them on top of the ground. My neighbor's yard to the east was covered with sand."

"So in developing the 1,200-acre muckland farm near Palmyra, I went back to my home state, Michigan, for willow cuttings to start windbreaks."

A choice of willows

The Michigan willow grew well and did the job, but it had some undesirable traits. The broad tree crowns robbed crops of sunlight and dropped numerous twigs into the vegetables. Kincaid has since tried various willows and other trees and shrubs. Many of these came from the Soil Conservation Service plant materials centers through his cooperation with the Jefferson County Soil and Water Conservation District. Extensive trial plantings have been maintained on the farm since 1955.

Kincaid specializes in raising carrots, mint, and onions, but he is also a plant hobbyist. "When he gets into a nursery, he is like a kid in a candy shop!" exclaims Mrs. Kincaid. Mixing his hobby with business, he has tried many kinds of trees and shrubs in the 5 miles of windbreaks he has planted to break the windflow over the organic soils he farms.

Dean has made willow cuttings available to other Wisconsin farmers for the taking. He gives new hands at the game the benefit of many years' experience of coping with wind damage to soil. This is a big item in a state where extensive muck and sand farming give the state a high ranking in the Nation's vegetable production.

A pruner at hand

Kincaid always keeps a pruner in the pickup truck as he travels about his farm. With this pruner he can clip a willow cutting and plant it in a matter of minutes. There are few holes in the Kincaid windbreaks.

Of the many barrier materials he has tried, Kincaid rates the laurel willow (*Salix pentandra*) as best. Norway poplars (*Populus canadensis eugenie*) have done well. Almondleaf willow (*Salix amygdalina*) was planted first, but it had

Dean Kincaid (left) takes a willow cutting with pruner. Newly constructed drainage ditch alongside of windbreak of Norway poplar with shrub row in front.

too many shortcomings. A variety of white willow (*Salix alba vitellina*), an attractive small tree the Kincaids spotted while vacationing in North Dakota, flourished and looked promising, but it proved too short and spreading to fit the needs of a muckland windbreak.

Siberian crabapple (*Malus baccata*), buffaloberry (*Shepherdia argentea*), and Russian-olive (*Elaeagnus angustifolia*) are small trees or large shrubs that have performed well as windbreaks and are valuable for wildlife. Best performing shrubs were lilac (*Syringa*), zabeli honeysuckle (*Lonicera korolkowi zabeli*), and cotoneaster (*Cotoneaster acutifolia*). Conifers as a group did poorly on the organic soils, but the most successful were blue spruce (*Picea pungens*) and Austrian pine (*Pinus nigra*).

The Kincaids have been cooperating with the Jefferson County District since 1953. Open and tile drains, surface drainage, dikes, and a pump drainage system, all in addition to the miles of windbreaks, are some of the practices in his conservation plan.

For wildlife too

The Kincaids point with pleasure to the 5 miles of planted wind barrier that provides excellent habitat for songbirds and other wildlife. A deer herd in the vicinity has greatly increased in the past few years.

Clearing, draining, and leveling the land and establishing windbreaks cost money and add up to a large per acre investment. Crop yields are high, but so is cost of production. Muck farmers are reluctant to set aside their expensive land for windbreaks. Dean Kincaid is no exception. He plants his barriers on ditchbanks or along access roads to reduce acres of cropland occupied by windbreaks.

"Windbreaks are a necessary part of my wind-erosion control system," says Dean Kincaid. "They supplement other measures such as cover cropping and timely sprinkler irrigation." ♦

Developer bases plans on soil survey

Plans for "At-Wood-Akers" subdivision sewage system near Crowley, La., are based on soil information provided through the Acadia Soil and Water Conservation District.

When Frank Atwood and his son, Frank, Jr., decided to convert their 160-acre rice farm to a residential development, they sought counsel from several private sources and government agencies, including the conservation district and Soil Conservation Service.

The Acadia Parish Soil Survey provided the data they needed to lay out sewerlines, streets, and 66 homesites. Preliminary study showed that wet soils and low percolation rates could hinder septic tank performance.

In keeping with known limitations for Crowley silt loam, the Atwoods decided to install an oxidation pond—the safest, most efficient method for this soil type. The odor-free central sewage system (a shallow lake that holds sewage long enough for bacterial decomposition) has been used successfully in other modern subdivisions beyond municipal sewerlines.

The 200- by 300-foot pond holds 5 feet of water with a 2-foot freeboard. It will be fenced and landscaped; adjoining land will become a park.

The Soil Conservation Service is also helping lay out roads and stormwater disposal systems. The SCS also contributed interpretative material for a leaflet about local soil characteristics of interest to new homeowners.—GEORGE W. GUILLORY, *district conservationist, SCS, Crowley, La.* ♦

At right, District Conservationist George Guillory (left) and Frank Atwood, Jr., discuss plans for a park in At-Wood-Akers. Below, road construction began after a study of soil survey data showed the best locations for streets and homesites.

Windbreak planting is big operation for districts

By W. H. Youtz
State resource conservationist, SCS, Huron, S. Dak.

Soil conservation districts are making big business out of windbreak planting in South Dakota by providing stock, equipment, and planting crews to district cooperators.

Last year nearly 3,000 farmers in the state made windbreak plantings of trees and shrubs. About two-thirds of the cooperators had planted windbreaks before.

About 90 percent of the 3 million trees planted each year protect additional land; 10 percent are renovation plantings or fill-ins for present windbreaks. Two-thirds of the plantings are for farmstead or feedlot protection, the others to protect cropland.

Of the state's 70 conservation districts, 60 employ tree planting crews each spring. Most districts have their own tree-planting equipment, including planters, tractors, trucks, and the like, worth a total of about $150,000.

In addition, districts have another $45,000 invested in storage facilities for young seedlings. The Corson Conservation District in north-central South Dakota purchased a service station and converted it into a mechanically refrigerated tree seedling storage unit that will handle up to 100,000 trees. Walworth, Spink, and other districts also plan to have improved refrigerated storage facilities ready for the 1970 tree planting season.

One conservation district rents a tree planter, another contracts the tree planting, and a dozen or so provide custom cultivation or chemical weed control to cooperators for windbreak plantings.

A typical district in the "windbreak business" will spend $2,000 for tree stock each year, $1,000 to employ a 2- or 3-man planting crew, and several hundred dollars on gas, oil, and repairs for tree planting equipment. The district charges cooperators enough to cover costs and maintain and replace equipment. The farmer in turn gets a quality job at a minimum cost.

The State Forestry Division nursery supplies most of the conifers. Most hardwood tree and shrub seedlings come from commercial nurseries.

The need for establishing new windbreaks will continue for many years, according to Orlow Eidam, president of the South Dakota Association of Conservation Districts. Each year, the boards' supervisors estimate their nursery stock needs for the coming 3 years. These estimates, furnished to nurseries, reflect annual increases in planting rates and cover more than 40 species of trees and shrubs.

Technical assistance and training is provided by the Soil Conservation Service, the South Dakota Game, Fish, and Parks Department, and the State Extension Service. The Agricultural Conservation Program and the Great Plains Conservation Program provide cost-sharing for windbreak establishment. ♦

Taking care of the tree plot (left) is included in the family chores on the Casper Malsom farm in the Ipswich District. A planting crew (right) puts in ponderosa pine for wildlife according to the conservation farm plan of Leonard Kriz in the Carter District.

The computer in river basin planning

By S. Glade Wilkes
Hydrologist, SCS, Carson City, Nev.

A computer program set up by the Soil Conservation Service for the Central Lahontan River Basin Type 4 Study in western Nevada and eastern California made possible a degree of detail that otherwise would have been impractical. The computer program was developed at the Desert Research Institute at Reno, Nev., to reflect the basin's water resources and needs.

Most of Nevada has an arid or semiarid climate, with an annual precipitation of less than 10 inches, and water is a vital factor in the state's economy. The purpose of the study was to inventory the present and potential water resource of the basin and determine the extent to which its present use, mainly irrigation, could be increased. The U. S. Department of Agriculture's field party for the Type 4 Study included in the investigations and analyses a water-budget type inventory of water resources similar to that completed for the Type 4 Study of the Humboldt River Basin in Nevada.

Since the Humboldt Study required many hours of manual computation, the need for a less time-consuming method of making the inventory was evident and prompted the development of a computer program that would simulate the annual hydrologic cycle for the Central Lahontan River Basin.

The computer program included establishing realistic precipitation amounts over the area concerned and developing a relation between precipitation, soil moisture, runoff, evaporation, and transpiration. These data would lead to the preparation of precipitation- and water-yield maps and an inventory of water depletions by six major categories: native vegetation, stream bottom lands, irrigated lands, phreatophyte areas, water surface and rockland areas, and municipal and industrial use.

The Walker River drainage system (2,733,000 acres) within the Central Lahontan Basin was subdivided into 19 subwatersheds and each evaluated separately. Precipitation and temperature data from representative weather stations were then projected over the area. Temperature and precipitation values dictated whether the occurrence of precipitation was rain or snow and whether the snow pack was accumulating or melting. The basic unit of time used was ½-day periods, daytime and nighttime, to account for the significant differences in rates of snowmelt. A reconnaissance soil survey provided the necessary data on soil water-holding capacity and type of existing ground cover. Evaporation and evapotranspiration computations reflected the soil moisture, vegetation, and climatic conditions. All input data in the program were developed by elevation zones.

The resulting output data reflected the contribution or depletion by specific geographic locations within the subwatershed. Simulated runoff by elevation zone and other factors were accumulated, producing totals for each watershed. Finally, the developed runoff data were checked against streamgage records, wherever available, to confirm results.

The speed of computers made possible a simulated water budget from daily climatic data recorded for several years. These data were checked against actual streamgage records wherever feasible. When consistently close comparisons occurred, it was assumed that a relatively reliable water yield and use relationship had been determined for the subwatershed. This way data on water yield and depletions were prepared for the 19 delineated watersheds in the Walker River system. This program is being used for the Truckee and Carson rivers, the remaining two river systems in

One of the high water-yielding tributaries of the Walker River Basin extends to a maximum elevation of 11,500 feet.

the Central Lahontan Basin of western Nevada and eastern California.

The computer program was designed so that the established water budget of a watershed for present conditions could be modified to reflect future conditions. This versatility provided added information for two proposed reservoirs in the Walker River system and gave some insight into the effects of improved agricultural water management.

A big IBM computer became the workhorse after initial development and testing of the program showed a need for larger capacity equipment to handle the complexity of a satisfactory water-budget analysis. The current program can process 10 years of data for any one of the subwatersheds in about 5 to 10 minutes. Experience with the Walker River Basin showed that it was necessary to process four or more combinations of interrelated parameters to determine the ultimate water resources available for future development. Computational requirements for these comparisons would be far beyond any practical consideration of manual computations.

This computer program makes it possible to develop water yield and depletion data from rather limited basic information. The program is widely adaptable to other areas that lack water-yield information and for this reason is being evaluated by Soil Conservation Service specialists for a Servicewide program. ♦

Conifers gain in windbreaks

The kinds of trees and shrubs being planted for windbreaks in the Great Plains are changing with time. Nowhere is this so evident as in Nebraska where the trend now is to use all conifers in protection plantings. Conifers' greater density reduces wind velocities and traps and holds snow within the belt.

In the Prairie States Shelterbelt Program in the thirties, and in the early-day Soil Conservation Service demonstration windbreak plantings, broadleaf trees made up about 80 to 90 percent of the plantings. In the years since these early plantings, many more conifers than broadleaves have been planted in windbreaks.

For example, broadleaf trees used for windbreaks in the years 1949, 1959, and 1968 made up 72, 28, and 12 percent of the total; shrubs 17, 7, 5 percent, respectively. Conifers, in comparison, amounted to 11, 65, and 93 percent, respectively, for the same years.

Eastern redcedar, ponderosa pine, Austrian pine, Scotch pine, Rocky Mountain juniper, and blue spruce are the conifers used most.

Good conifer seedlings available at a reasonable cost, Government cost-sharing programs, and improved methods of storage and handling are factors affecting this trend. With technical assistance in planning from the Soil Conservation Service, most of Nebraska's soil and water conservation districts handle and plant trees and have special storage facilities to hold conifer seedlings safely until planted.—JAMES W. CARR, JR., *forester, SCS, Lincoln, Nebr.* ♦

Women promote Stewardship Week

Some Louisiana district supervisors had a helping hand from their wives during the 1968-69 campaign for Soil Stewardship Week this spring.

Conservation was a prime topic of conversation among members of the Ladies' Auxiliary of the Louisiana Association of Soil and Water Conservation Districts after Mrs. Clyde Hoyt (president) called them to action last October.

Women answered Mrs. Hoyt's challenge in nearly half of the 29 districts. All winter they encouraged community leaders to pay special attention to soil and water conservation for 7 days in May.

The ladies put up displays in public places, wrote news releases, and prepared television and radio programs. They urged mayors to sign proclamations, engaged speakers for civic organizations, informed and entertained clergymen, worked with garden clubs, and contacted schools.

On Monday morning, May 12, students in 55 schools in the Northeast Soil and Water Conservation District heard their student body presidents read a brief speech written by Mrs. J. K. Tillotson, wife of an honorary supervisor.

Auxiliary members hope that they'll be asked to help ready the state for another week of serious thought and talk about conservation next year. ♦

Many lakes for flood prevention and fun

Some 5,000 watershed lakes and reservoirs have been built by local communities with the help of the Soil Conservation Service. The 5,000 mark was passed during the fiscal year ended June 30 as several hundred new lakes were added to the total of 4,900-odd watershed lakes already on the land.

Although only 1 percent of the lakes were originally designed with recreation in mind, almost 99 percent of them are now used to some degree for outdoor fun. Some of the lakes, varying in size from less than 10 acres to 1,800 acres, have become the nucleus for new or enlarged public parks. Many have provided communities with their first and only chance for water sports.

The basic purpose of almost all the lakes is flood prevention, but recreation is an "official" second purpose at 50 lakes where local watershed project sponsors are paying at least half of the added costs. These 50 lakes provide an estimated 4 million user days of water-based fun annually. ♦

Conservation in action . . .

Forest added to college's resources

Copiah-Lincoln Junior College is beginning to put some of its idle acres to work in a tree-planting program near Wesson, Miss.

This year 40,000 slash pine seedlings were planted and 2 miles of permanent access roads were built on an estimated 48 acres of college property. The project is part of a conservation plan developed by SCS in cooperation with the Copiah County Soil Conservation District.

College officials and trustees decided that land formerly in crops and pasture would be of more value to the college if converted to timber. The change in land use would also help curb erosion that has been a constant problem in the hilly tract.

The newly established forest may serve some educational purposes while it is growing and then sold later to provide income for the school.

Roads will serve as firelanes and trails where students and teachers can stroll and enjoy this example of conservation at work in their own county.

Crown Zellerbach, Inc., agreed to furnish the trees if the district would arrange to have them planted. SCS contributed soils information for the site and the Mississippi Forestry Commission provided personnel and equipment to do the job.—CECIL REEVES, *conservation technician, SCS, Hazelhurst, Miss.*

Alabama

District's rented grass planter proves popular

Cooperators with the Lawrence County Soil and Water Conservation District can rent a planter when they're ready to improve pastureland with bermudagrass.

Ninety-nine farmers have planted more than 400 acres of palatable, perennial forage since the district board bought a two-row mechanical sprigger in 1967.

Supervisors selected the high-yielding, dependable Midland variety after searching for a grass that would last through the long, hot summer. Their sprig source is the Tennessee Valley Authority nursery at Muscle Shoals, Ala.

Hadley Key, an enterprising cooperator, bought a bermudagrass digger to go with the rented planter. He has planted more than 200 acres for neighbors on a custom basis.—CHARLES T. MATHEWS, *district conservationist, SCS, Moulton, Ala.*

Oklahoma

Grazing acreage increases as brush disappears

Lush weeping lovegrass now covers 48 acres of pastureland owned by Vernon Breckenridge of Okeene. It was once choked with brush so thick a man couldn't walk through it.

"Two years ago one cow couldn't live on that land," Breckenridge said. "But I plan to graze 10 to 12 cows and calves there next summer." He cleared the area in 1967 with the aid of the Great Plains Conservation Program.

Breckenridge's 420-acre farm near the Cimarron River is covered by his Great Plains contract. He has been a cooperator with the Cimarron Valley Soil and Water Conservation District since 1964.

Other types of tame pasture included in his year-round forage program are Midland bermudagrass, small grains, and native grasses.

Breckenridge also practices good soil and water management on his father's 273-acre unit and some rented acreage. Rotations of small grain, mung beans, and cowpeas grow on 624 of the 1,120 acres in his entire operation.

The former vocational agriculture teacher returned to full-time farming in search of personal satisfaction and a country home for his family. In the future, he hopes to convert from a 100-cow commercial operation to 150 head of registered Polled Hereford cows.

In addition to responsibilities on his own ranch, Breckenridge served his community as committeeman on the Kingfisher County Agricultural

At right, district's bermudagrass sprigger. Below, Vernon Breckridge (right) shows Harold Welch, SCS, one season's growth of weeping lovegrass.

Stabilization and Conservation Committee after being elected in September 1968.—ALVIN M. CLEMENTS, *assistant state conservationist, SCS, Stillwater, Okla.*

Nebraska

Sound management stretches range capacity

Windbreaks, wells, and 20 years of work have more than doubled the carrying capacity of Gerald (Jerry) Bammerlin's ranch in northwest Keya Paha County, Nebr.

Grazing capacity for Bammerlin's 4,400-acre cattle operation in the K-B-R Soil and Water Conservation District has climbed from 2,042 to 5,280 animal-unit-months a year without a corresponding loss of range quality. Rotation-deferred grazing, proper grazing distribution, and grass interseeding have eliminated unevenly grazed conditions that held him back originally.

Bammerlin started out with 210 head, two range wells, a small lake, and a creek. He became a cooperator in 1954 and later served as a district supervisor for 6 years.

With cost-sharing made possible by a Great Plains Conservation Program contract signed in 1959, he put in 6 miles of cross-fencing, four livestock wells, and 8 acres of livestock windbreaks. Now he has 14 wells and 35 acres of trees that have proved their value many times.

Bammerlin attributes a two-thirds increase in yield of feed and forage on 236 acres of cropland to improved rotation, meadow subirrigation, legume seeding, and other practices. He won the K-B-R District honor award in 1966 for his conservation achievements.

Bammerlin is chairman of the Keya Paha County Agricultural Stabilization and Conservation Service Committee. He has served as a consultant to local chapters of 4–H and Future Farmers of America.—TED F. CLAPPER, *soil conservationist, SCS, Ainsworth, Nebr.* ♦

Michigan

Project measure honors local mailman

A new fountain in Scottville's Riverside Park is Mason County's first entry on the list of accomplishments within the Northwest Michigan Resource Conservation and Development Project.

Rigel memorial fountain was dedicated on Memorial Day—8 months after the 13-county project was authorized for planning assistance. It gives residents another reason to be proud of a park they have created and are still improving.

Construction funds were donated by friends of Donald "Donnie" Rigel, a rural mail carrier whose love of the outdoors had been well known in this community beside the Pere Marquette River.

Leo Teholiz, art director of West Shore Community College, designed the native stone structure after Mrs. Rigel approved the Mason County RC&D steering committee's proposal.—ROBERT J. AMSTERBURG, JR., *district conservationist, SCS, Scottville, Mich.*

Entrance to park where fountain was built.

Texas

Farmers adjust equipment and parallel terraces

Modern farmers in Texas using modern farming equipment on parallel terraces find it important to either adjust the equipment or shape the terraces to fit the equipment and keep them in good repair.

John McFarland, a cooperator with the Terry Soil and Water Conservation District near Brownfield, wanted to shape up his terraces so that he could farm them with six-row equipment. Using a motor grader he made his terraces wide enough so that he could put six rows on each side of the ridge. When he plows his field each year, the height of his terrace is maintained.

W. W. Emerson, a cooperator with the Lynn Soil and Water Conservation District near Tahoka, farms between his terraces and keeps the terraces in small grain. The small grain keeps them from eroding and wearing down from frequent cultivation. "Even if my terraces filled up and ran over the top, they would not break," Emerson says.

J. W. Gardenhire, farmer in Lynn and Dawson counties, finds it impractical to build his terraces big enough to fit his eight-row planter. To keep from tearing them down, he put hinges in his tool bar so that his equipment is flexible enough to conform to the shape of the terrace ridges.

These farmers recognize the need for repairing the end closures and internal blocks constructed as part of the terrace system. After heavy rains, they examine the blocks and build them back if damaged. The farmers put the terrace ridges up to at least 1 foot high to hold the expected runoff water.—BEN R. DAY, *agricultural engineer, SCS, Brownfield, Tex.* ♦

Meetings . . .

Foresters meet to "measure up"

"Measuring Up" will be the theme of the 1969 national convention of the Society of American Foresters being held in Miami Beach, Fla., October 13-16.

The theme "Measuring Up" is a direct challenge to the professional foresters of the Nation to perform their duties in a manner that will bring credit to their profession.

The topics to be presented in the general sessions are "The Forester —a Professional," . . . "His Growth," and . . . "His Responsibilities."

Preconvention trips include tour of woodlands operations of two industries in Jacksonville, Fla., and Mobile, Ala., and a visit to the Southeastern Forest Experiment Station. Post-convention tours include trips to Jamaica and Nassau.

Water Federation discusses water reuse and wastes

The Water Pollution Control Federation, hosted by the Texas Water Pollution Control Association, holds its 42d annual conference on October 5-10 in Dallas, Tex., and will reconvene in Monterrey, Mexico, October 12-14.

Some of the sessions include topics and discussions on water reuse, industrial wastes, wastewater rates and service charges, animal feedlot wastes, water-quality monitoring and data interpretation, river basin management, wastewater-treatment facility design, new process equipment developments, and thermal pollution.

Association tackles western water problems

Water-resource problems of major interest to the Western States will be the main part of the program for the 38th annual meeting of the National Reclamation Association, Spokane, Wash., October 22-24.

Tours to Grand Coulee Dam or a North Idaho scenic trip are planned prior to commencement of the meeting.

Dates and places

October 1-4, National Conference of Editorial Writers, Indianapolis.
5-10, Water Pollution Control Federation, Dallas, Tex.
8-11, National Association of Biology Teachers, Philadelphia, Pa.
13-16, Society of American Foresters, Miami, Fla.
13-17, American Society of Civil Engineers, Chicago, Ill.
19-22, American Chamber of Commerce Executives, Detroit, Mich.
22-24, National Reclamation Association, Spokane, Wash.
21-25, Association of Engineering Geologists, San Francisco, Calif.
26-29, American Association of State Highway Officials, Philadelphia, Pa.
27-31, American Water Resources Association, San Antonio, Tex.
November
3-5, Western Seedmen's Association, Kansas City, Mo.
9-12, National Association of State Universities and Land Grant Colleges, Chicago, Ill.
9-12, National Forest Products Association, Boca Raton, Fla.
9-14, American Society of Agronomy, Detroit, Mich.
9-14, Soil Science Society of America, Detroit, Mich.
10-12, Geological Society of America, Atlantic City, N. J.
10-19, National Grange, Daytona Beach, Fla.
24-Dec. 1, General Assembly International Union for the Conservation of Nature, New Delhi, India. ♦

Idaho receives model tree farm

A model Tree Farm established at Farragut State Park, Idaho, for the recent 7th National Boy Scout Jamboree, has been donated by the American forest industry to the Idaho Department of Parks to become a permanent exhibit.

The gift was made by forest products companies which developed the model Tree Farm for use during the Jamboree to demonstrate sound forestry management practices and principles. ♦

Review

Even-Aged Silviculture for Upland Central Hardwoods. By Benjamin A. Roach and Samuel F. Gengrich. *1968. USDA Agriture Handbook 355. 39 pp., illus. $0.50.*

For many years, we have watched the research in the even-aged management of upland hardwoods at the Vincent Furnace and Mead experimental forest in Ohio. The publication "Even-Aged Silviculture for Upland Central Hardwoods" is the published results of this and other experimental work. This is one of the major contributions to the management of central hardwoods since people bagan to be interested in managing this type of timber.

The seemingly obvious fact that the desired species of timber growing in the central hardwoods needed space and sunlight for desired growth was overlooked by foresters for many years. Even though examples could not be found, it was consistently argued that individual tree selection would result in a continued high-quality stand of the desired trees on all sites.

Clear cutting was a dirty word in forestry. But after years of demonstrating the "desirability" of such a practice, a few of the practicing foresters and research foresters began looking at the results of clear cutting made years ago to prove that it was a "bad" practice. Many of the observers were astounded at the results. On these demonstrations of "poor" management were the best of the young stands of thrifty growing and desirable trees. Obviously, something was wrong, and research began exploring the possibility of managing hardwood forest under the principles of even-aged silviculture.

The Soil Conservation Service field people in the Central Hardwood Region will find the published results of this hardwood research both interesting and familiar; per-

haps, interesting because it is familiar. The principles of silviculture and hardwood management outlined in this publication are the principles that they have been following for the past several years. In addition, the research findings are tied in with soils that should be as familiar to SCS men as their own backyard.

Of course, the authors being true research men have hedged a bit in true research fashion. They note that the research was carried out in a rather limited area and suggest that some caution should be used in following the principles outlined in areas more remote from the place of the research work. They also insist that additional research is needed. Be that as it may, we know that there is always a need for continued research in all facets of forest management, and we know that precise management details can be determined only with onsite examination of a specific area. We also know that the principles outlined by this publication are both sound and practical. And we believe that these principles have a very wide application beyond the Central Hardwood Region, and, perhaps, encompassing most of the major hardwood timber types in the Nation.—CARROW T. PROUT, JR., *chief forester, SCS, Washington, D. C.*

New publications

The Hired Farm Working Force of 1968. BY ROBERT C. MCELROY. *1969. USDA Econ. Res. Serv. Agr. Econ. Rpt. 164.* 30 pp., illus. Gives data on the size and composition of the 1968 hired farm working force and on the employment and cash earnings from farm and nonfarm wage-work obtained during the year.

Man and Nature in the City. *1968. U. S. Dept. of Interior, Bur. of Sport Fisheries and Wildlife. 92 pp., illus. $1.* Publication of 16 papers and discussions presented by specialists from colleges, universities, and federal, state, and private organizations at a symposium sponsored by the Bureau of Sport Fisheries and Wildlife. The seven topics discussed were on: "Human Needs and the Natural Environment," "Nature and the Urban Dweller," "Nature in Our Cities," "Meeting Urban Wildlife Needs," "Nature and the Ghetto Dweller," "The Natural World of the New City," and "Urban Youth and Natural Environments."

Minimum Design Standards for Community Water Supply Systems. *1968. U. S. Dept. Housing and Urban Development FHA 4517.1. 74 pp.* Handbook presenting criteria for nationwide use of developers, builders, and consulting engineers in developing privately owned central water systems that will provide properties insured by Federal Housing Administration with water in adequate quantity, of acceptable quality and sufficient pressure.

Tree Diseases of Eastern Forests and Farm Woodlands. BY GEORGE H. HEPTING AND MARVIN E. FOWLER. *1969. USDA Agr. Inf. Bul. 254. 48 pp., illus. $0.35.* Presenting some of the information formerly used in Farmers' Bulletin 1887, "Reducing Losses From Tree Disease in Eastern Forests and Farm Woodlands," this publication gives information on important diseases of 24 major species.

The Life of the Forest. *1969. St. Regis Paper Co. New York. 15 pp., illus.* Beautifully illustrated in color, the booklet explores the growth process of trees, their role in the forest world, how they can be utilized fully without waste, and how their quality can be improved. It also shows a few of the wonders in the forest community.

Flowers and Foliage Plants. Production and Sales in Selected States, 1956-68. *1969. USDA Statistical Bulletin 442. 35 pp.* Contains all series of commercial floriculture estimates of the Crop Reporting Board based on annual reports from flower and foliage plant growers.

Outdoor Education on Your School Grounds. BY NORMAN F. MARSH. *1968. The Resources Agency, Office of Conserv. Education, State of California. Sacramento, Calif. 82 pp., illus.* A manual for elementary and junior high school teachers for conducting effective learning programs on school grounds.

Changes in Farm Production and Efficiency, a Summary Report. *1969. USDA Statistical Bulletin 233. 17 pp.* Presents major statistical series on farm production, production inputs, and efficiency for the 10 farm production regions.

Forest Taxation and the Preservation of Rural Values in New York. BY ELLIS T. WILLIAMS. *1969. USDA, Forest Service, Agr. Econ. Rpt. 150. 24 pp. $0.30.* Study conducted of the forest tax situation in New York; study could have broader application.

Soil surveys

Osceola County, Michigan. BY WESLEY METTERT. *1969. 139 pp., illus.; maps 4 inches to the mile (1:15,840).* Fieldwork by Wesley Mettert, Sheldon Holcomb, Stephen Shetron, Carl Basil, Lloyd McKenzie, Eliahu Wurman, Yassogleu Nicolaas, Clyde Black, and Donald Franzmeier.

Salem County, New Jersey. BY VAN R. POWLEY. *1969. 86 pp., illus.; maps 4 inches to the mile (1:15,840).* Soils surveyed by Albert D. Backer, L. E. Lindley, Van R. Powley, and Leonard Zobler.

Pike County, Pennsylvania. BY DAVID C. TAYLOR. *1969. 83 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by David C. Taylor, Percy Billings, Glen Fisher, and Gene Trapp.

Preble County, Ohio. BY NORBERT K. LERCH, PAUL E. DAVIS, LAWRENCE A. TORNES, ERNEST N. HAYHURST, AND NILES A. MCLODA. *1969. 101 pp., illus.; maps 4 inches to the mile (1:15,840).*

Collin County, Texas. BY ARTHUR HANSON AND FRANKIE F. WHEELER. *1969. 55 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Fieldwork by Dan A. Blackstock, Curtis H. Deaver, and Edward W. Pauls.

Delaware County, Ohio. BY FRANCISCO MATANZO, KENNETH L. STONE, JR., R. D. THOMPSON, AND KENNETH H. WENNER. *1969. 71 pp., illus.; maps 4 inches to the mile (1:15,840).*

Clay County, Iowa. BY CHARLES S. FISHER. *1969. 102 pp., illus.; maps 4 inches to the mile (1:15,840).*

RC&D Project to spur local economy

The 7-million-acre Sangre de Cristo Resource Conservation and Development Project in southern Colorado, involving Custer, Fremont, Huerfano, Las Animas, and Pueblo counties, is now eligible for special assistance from U. S. Department of Agriculture agencies.

Project sponsors—nine conservation districts, 12 towns and cities, and five county boards—have proposed projects that should lead to new industry, tourism, trade, and sustained employment to reverse the economic decline of past decades.

Resource conservation and development (RC&D) activities are carried out by local people with Soil Conservation Service assistance.♦

From the Administrator:

Windbreaks and conservation

Many of us commonly associate windbreaks with the Great Plains. In the windswept expanses of the Great Plains, windbreaks have proved their economic, social, scenic, and environmental worth.

Windbreaks, too, are a part of the farmstead setting in many areas of the Corn Belt. They have, in fact, widespread and varied uses that materially improve the physical environment in all 50 states.

Windbreaks protect the muck soils of New York and Ohio—soils that are highly susceptible to wind erosion. In New Jersey, rows of trees stop damage to vegetable crops. Similar plantings keep the windblown sands from cutting cotton and soybeans in South Carolina.

In Florida, vegetable and citrus growers rely on fast-growing Australian-pine, while California growers of the same crops plant rows of sunflowers to supplement the protection afforded by the Eucalyptus windbreaks. In Alaska, hardy Matanuska farmers need and use windbreaks in carrying out their conservation plans, as do those on the Kona coast of Hawaii.

Feasibility of windbreaks and shelterbelts in the Plains country was demonstrated through the Shelterbelt Program and the Prairie States Forestry Project of the Forest Service in the 1930's. In 1942, SCS was assigned Department responsibility for windbreaks, a responsibility it still carries out through soil and water conservation districts and with state forestry departments.

Traditionally, foresters have assumed the leadership in assisting landowners set out and maintain windbreaks. But windbreaks are not just a forestry practice, nor are they a biology or an agronomy practice. Windbreaks are a conservation practice, one to which all of the disciplines have contributed.

Windbreaks are the conservation measure that probably affects as many facets of our environment as any single one we employ. From an environmental standpoint, there is no other single practice in our conservation treatment package that:

. . . Affords protection to the urban resident as well as the farmer and rancher, and

. . . Protects homes and other buildings from wintry blasts and drifting snows and dust-laden air of summer, and

. . . Reduces the steady and often mentally exhausting gales to a gentle breeze around a farmstead, and

. . . Slows the winds down so they no longer pick up and transport particles of soil, and

. . . Reduces noise from highways, playgrounds, aircraft, and other sources, and

. . . Alters the "microclimate" of fields and the responses of plants to temperature, carbon dioxide, and water in a beneficial manner, and

. . . Can be designed to trap snow or spread it evenly over fields, and

. . . Provides livable outdoor shelters for livestock, and

. . . Offers homes, food and shelter for wild birds and animals, and in some instances food for man, and

. . . Creates so much beauty in the treeless plains, and in other areas where trees have yielded to the bulldozer, tractor, and harvester.

We face the challenge now, in both town and country planning, of stepping up our efforts in windbreak establishment and use, just as we do in conservation work related to woodland uses for recreation, watershed protection, wildlife, erosion control, and beautification.

The Service can provide a great deal of information and expertise on soils and their relation to tree species and growth; on tree selection and care, and on windbreak design and planting. Our soil surveys and plant materials centers continue to enlarge the body of scientific information we can share with land users, as do USDA research facilities. This year, let us make "Windbreaks for People" part of the enlarging "Trees for People" movement that recognizes trees serve man in many ways before they mature for harvest as wood products.

Kenneth E. Grant

UNITED STATES
GOVERNMENT PRINTING OFF
DIVISION OF PUBLIC DOCUME
WASHINGTON, D. C. 2040

OFFICIAL BUSINESS

SC JAN
UNIVERSITY MICROFILMS
SERIALS SECTION
300 NORTH ZEEB RD.
ANN ARBOR, MI 48106

POSTAGE AND FEES PAID
GOVERNMENT PRINTING OFFICE

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Operation Arbor Green charms suburbanites

A thousand trees ordered by suburbanites in an hour stirred up more excitement in Binghamton, Broome County, than did the planting of more than a million trees last spring by landowners in another rural county in New York.

Those thousand-an-hour trees bought from a commercial nursery and sold by the Broome County Soil and Water Conservation District weren't sold in one bundle, but singly, or in packages of three or seven trees—whatever number the buyer needed. The demand was so great that some 2,000 people called or queued up to buy 26,500 trees and plant them on at least a thousand small properties.

Sam Rizzi started it all. He's one of the new breed of conservation district directors, representing the nonfarm landowners and land-users in the Broome County District. He doesn't own a farm. He like trees, though.

"The State Conservation Department sells trees only in bundles of a thousand. My neighbors in the housing development need two, or maybe 20, trees for planting a steep bank, or a clump for wildlife cover, or just for beauty," said Rizzi.

So Sam persuaded the other directors that the Broome District should buy a thousand seedlings from a commercial nursery for resale. Sam agreed to handle the publicity for "Operation Arbor Green."

Willis Thompson (right), first customer, picks up his Norway spruce and white pine seedlings from Mrs. David Franta of Broome County ASCS office and Edward Henderson of the Broome County District (photo courtesy of Binghamton Press).

As soon as the story broke in the papers and was announced on the radio and TV, orders started coming in and didn't stop when the thousand trees were gone.

"What do we do now?" cried the two district clerks. The private nurseryman was contacted again. Yes, he'd be very happy to supply another 25,000 trees and so on.

The girls spent several days just answering telephone inquiries. People who couldn't get a call through stood in line outside the office door to order trees.

The girls figured they had more than 2,000 callers. Very few of these people had ever had any previous contact with the district, or any of the other agencies in the Broome County Farm and Home Center. They were glad to learn how the district directors working with commercial nurserymen could provide this much needed service.

Next year the district directors plan to increase the number of varieties of trees and add some wildlife shrubs. They hope this is just the beginning of many new ways the district can expand its program to reach more urban and suburban landowners and get more land treatment done.—HOWARD H. WILSON, JR., *district conservationist, SCS, Binghamton, N. Y.*◆